

C l a i m s

1. Hydraulic switchable distribution valve (10) in particular for shield supports in underground mining, with:
 - a high pressure port (P), a load port (A), a return port (R), and a control pressure port (ST) for hydraulic fluid,
 - a valve piston (12), axially displaceable in a location hole of a valve seat mounting (11), which at its open end face (26) is connected to the load port (A), which comprises a radial aperture (29) and which when in contact with a sealing seat on the valve seat mounting side blocks off the load port (A) from the high pressure port (P);
 - a control piston (13) in a control piston guide (14), which can be displaced by means of a force exerted by a control pressure at the control pressure port, by means of which the return port (R), as a function of the position of the control piston, can be connected with the load port or can be blocked off from the load port (A) and the high pressure port (P), characterised in that
 - the valve piston comprises a second radial aperture (28), displaced towards the end face relative to the first radial aperture (29), and that the first radial aperture (29) can be closed by the control piston (13) with the arrival of the control piston (13) at an intermediate position between an initial position and an end position.

2. Distribution valve (10) in accordance with Claim 1, characterised in that the valve piston is guided between both radial apertures (28; 29) in a valve piston sliding guide (20A) with the formation of a throttling clearance, where the second radial aperture (28), as a function of the location of the valve piston, preferably lies opposite to the valve piston sliding guide (20A) or lies on the high pressure side of the valve piston sliding guide (20A).

3. Distribution valve (10) in accordance with one of the Claims 1 or 2, characterised in that the throttling clearance, if the control piston (13) is positioned in the intermediate position, with contact between the valve piston (12) with the sealing seat, forms a restricted fluid connection between the load port (A) and

the return port (R), and with an opened sealing seat forms a restricted fluid connection between the high pressure port (P) and the return port (R).

4. Distribution valve (10) in accordance with one of the Claims 1 to 3, characterised in that the load port (A) in the initial position of the control piston (13) is connected with the return port (R) via the first radial aperture (29), and in that the control piston in its end position closes off the return port (R), where the second radial aperture (28) completely unblocks the fluid connection between the high pressure port (P) and the load port (A).

5. Distribution valve (10) in accordance with one of the claims 1 to 3, characterised in that the control piston (13) is free to move relative to the valve piston (12) from its initial position up to its intermediate position, and travels from the intermediate position to the end position coupled with the valve piston (12).

6. Distribution valve (10) in accordance with Claim 5, characterised in that the control piston (13) at its end face facing the control pressure port (ST) comprises an inward-facing flange (34), which in the intermediate position of the control piston (13) comes into contact with a shoulder section (35) of the valve piston (12).

7. Distribution valve (10) in accordance with one of the Claims 1 to 6, characterised in that the valve piston (12) is fitted with a valve cone (15) and that a sealing ring (18) with a cone surface provided for the sealing seat is located on the valve seat mounting (11), where the sealing ring (18) is preferably fixed in the valve seat mounting (11) by means of a retention ring (20) and that the retention ring (20) with its interior wall surface forms the valve piston sliding guide (20A).

8. Distribution valve (10) in accordance with Claim 7, characterised in that the valve piston (12) on its outer wall surface comprises a cone face ring (16), on the bottom surface of

which is provided the valve cone (15), the cone face ring (16) being located on the high pressure side of the second radial aperture (28).

9. Distribution valve (10) in accordance with one of the Claims 1 to 7, characterised in that the control piston (13) comprises a control piston shaft (36), that in the intermediate and end positions of the control piston (13) overlaps the first radial aperture (29) so as to sealedly overlap it or overlap the latter while leaving a throttle clearance.

10. Distribution valve (10) in accordance with Claim 9, characterised in that a sealing seat element is located in the valve seat mounting (11) on which, in the end position of the control piston (13), a forward end of the control piston shaft (36) comes into sealing contact.

11. Distribution valve in accordance with Claim 10, characterised in that the retention ring (20) and the sealing seat element are formed in one piece and/or that the valve seat mounting (11) comprises a stepped location section (19) in which the sealing ring (18) and the retention ring (20) are clamped in a form fit manner.

12. Distribution valve (10) in accordance with Claim 11, characterised in that the retention ring (20) surrounds the sealing ring (18) on the side facing away from the piston sealing face with an inward chamfered ring mounting (22) in a form fit manner.

13. Distribution valve in accordance with one of the Claims 2 to 12, characterised in that the sealing ring (18) is manufactured from a plastic.

14. Distribution valve (10) in accordance with one of the Claims 3 to 13, characterised in that the retention ring (20) is manufactured from a steel.

15. Distribution valve (10) in accordance with one of the Claims 1 to 14, characterised in that the individual components of the distribution valve are clamped in a force fit manner by means of a screw fixing in the valve housing, which screw fixing closes off the location hole toward the outside.

16. Distribution valve (10) in accordance with one of the Claims 2 to 15, characterised in that a closing spring (17) located in the valve seat mounting (11) acts together with the valve piston (12) such that the valve cone (15) is clamped against the sealing ring (18).

17. Distribution valve (10) in accordance with one of the Claims 1 to 16, characterised in that the first radial aperture (29) and/or the second radial aperture (28) is configured as a radial hole and/or the radial apertures (28, 29) consist of a number of radial holes, preferably four, located around the circumference and spaced apart from each other.

18. Distribution valve (10) in accordance with one of the Claims 1 to 17, characterised in that the valve piston (12) is axially secured in the valve seat mounting (11) with a snap ring (40).

19. Distribution valve (10) in accordance with one of the Claims 1 to 18, characterised in that the valve piston (12) comprises on its closed face opposite to the open end face (26) a connecting thread (39) for connection of a disassembly tool.